APPENDIX A5

Construction Inspection Report
South Plant Transmission Pipeline
Phase I and Phase II

Construction Inspection Report
for
Newmark OU Remedial Action
Newmark Ground Water Contamination Superfund Site
South Plant Transmission Pipeline
Phase I and Phase II

DRAFT

Prepared for:

Contract No. 68-W-98-225 / WA No. 015-RARA-09J5
U.S. Environmental Protection Agency
Region IX
75 Hawthorne Street
San Francisco, California 94105

Prepared by:

URS Group, Inc.
2520 Ventura Oaks Way, Suite 250
Sacramento, California 95833

February 2002

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1.0 INTRODUCTION

This report is a summary of field inspections performed during the construction of the Newmark South Plant Transmission Pipeline, Phase I and Phase II.

The pipeline construction inspection was performed by URS Group, Inc. (URSG) for the United States Environmental Protection Agency (USEPA). URSG performed the inspection under contract number 68-W9-0054 and work assignment number 54-47-9NJ5.

1.1 JOB DESCRIPTION

The South Plant Transmission Pipeline is part of the Newmark Groundwater Contamination Superfund Site and connects a series of five extraction wells located on 11th Street to the South Plant. The North and South Plants consist of two separate granular activated carbon (GAC) water treatment plants. The plants remove organic contaminants from groundwater which is pumped to the plants through a system of pipelines. The North Plant treats water that is pumped from the source of contamination, and the South Plant treats water that is at the leading edge of the contaminated groundwater plume.

There are two South Plants. The first is located on Waterman Avenue, one block north of the Route 30 Freeway. It includes sixteen 20,000 pound GAC vessels, with a total design flow rate of 5,610 gpm. The vessels operate as eight serial pairs in parallel. The second south plant is located at 17th and Sierra Way. Six 20,000 pound GAC vessels operate in three series pairs to treat 2,000 gpm.

El-Co, Inc. (El-Co) and Trautwein Construction, Inc. (Trautwein) were procured and subcontracted by the City of San Bernardino Municipal Water District (SBMWD) to complete the construction of the South Plant Transmission Pipeline, Phase I and Phase II.

El-Co was responsible for placing the following sections of the Phase I pipeline:

- East on 11th Street, from Extraction Well Number 3 to the corner of Sierra Way. This section of pipeline also connected Extraction Well Number 4, located at the corner of Sierra Way.
- South on Sierra Way, to the corner of 9th Street.

Trautwein was responsible for placing the following sections of the Phase II pipeline:

- East on 11th Street, from Sierra Way to Extraction Well Number 5, located near the corner of Wall Avenue.
- West on 11th Street, from Extraction Well Number 3, located near the corner of Mountain View Avenue, to Extraction Well Number 1, located at the corner of 11th Street and Stoddard Avenue. This section of pipeline also connected Extraction Well Number 2, located near the corner of

Arrowhead Avenue.

- North on Mountain View Avenue from the intersection of 11th Street to just north of 21st Street at Station 60+63.

- This section of pipeline also connected the 17th Street Plant, located on 17th Street, near the corner of Sierra Way.

2.0 CONSTRUCTION SUMMARY

2.1 TASKS COMPLETED

2.1.1 El-Co Sequence of Work

September 1996

- Commenced installation of the 16-inch ductile iron pipe (DIP) waterline 24-inch DIP, and the 12-inch PVC waste line on September 3, at the Extraction Well Number 3 location on 11th Street.
- Terminate the 24-inch dip waterline at Mt. View.
- Terminate the 16-inch DIP waterline at the Extraction Well Number 4 location on September 16. Continue installing the 12-inch PVC south on Sierra Way.
- Completed the well connection assembly at Extraction Well Number 4 on September 27.

October 1996

- Terminated the 12-inch PVC at an existing catch basin location at 9th Street on October 3.
- Performed a hydrostatic test of the pipeline on February 9.

2.1.2 Trautwein Sequence of Work

January 1997

- Commenced installation of the 12-inch DIP on 11th Street on January 27, at Sierra Way (Station 36+20). The pipeline was terminated at the location of Extraction Well Number 5 on January 30.

February 1997

- Commenced installation of the 16-inch DIP waterline and the 12-inch PVC waste line on 11th Street on February 4, at Well No. 3 (Station 27+40).
- Performed a hydrostatic test of the first section of pipeline installed in 11th Street on February 5.
- Terminated the 12-inch waste line and completed the well connection assembly at the Extraction Well Number 2 location on February 12.

- Terminated the 16-inch DIP waterline and completed the well connection assembly at the Extraction Well Number 1 location on February 21. Performed the hydrostatic test immediately afterward.

- Commenced installation of the 16-inch and 24-inch DIP waterlines on Mountain View to north of 21st Avenue on February 24, at Station 6+32.

March 1997

- Terminated the 16-inch DIP waterline and completed the well connection assembly at the 17th Street Plant location on March 21.

- Completed the installation of the16-inch DIP in Mountain View Avenue to north of 21st Avenue on March 31. Performed the hydrostatic test immediately afterward.

2.2 PROBLEMS ENCOUNTERED AND RESPECTIVE SOLUTIONS

- In areas where adequate compaction could not be obtained due to poor soil conditions, Class II backfill was imported, placed and compacted.

- Abandoned unmarked gas pipelines were encountered during excavation at various locations in 11th Street, Mountain View Avenue, and Sierra Way. These were removed and properly disposed of off-site.

- A combination air vacuum/release valve was added to the design and installed at the corner of 11th Street and Sierra Way to release accumulated air at a high point in the pipeline.

2.3 QUALITY ASSURANCE TEST SUMMARY

2.3.1 Compaction Testing

Soil compaction tests were taken by CHJ Inc. (CHJ),a certified independent testing lab. Tests were taken of trench backfill, sub-grade, and base material. All of the compaction tests were taken with a nuclear density gauge, using the Nuclear Density Gauge method per ASTM standard D 2922.

2.3.2 Hydrostatic Testing and Disinfection

The hydrostatic tests were performed on all newly installed pipelines according to The City of San Bernardino Municipal Water Department (SBMWD) Specification No. 1292, Section 6-1.1. All newly installed pipe was pressure tested at 225 pounds per inch continuously for a period of two hours. Water leakage was measured by determining the quantity of water required to maintain test pressure. Any water leakage was not to exceed 10 gallons per inch diameter per mile of pipe per 24 hours under these testing conditions. Pipe

installation would not be acceptable until all leakages were stopped or until the leakage for the section of line tested was less then the rate of leakage specified. All pipelines tested passed the hydrostatic tests.

All newly installed pipe was disinfected. Chlorine was introduced into the pipeline filled with water via a water injector. The chlorine concentration was to be between 50 and 80 parts per million (ppm). This mixture was retained in the pipe for 24 hours. After this time, the chlorine residual was to be at least 25 ppm. Following chlorination, all water in the pipeline was flushed out until the replacement water showed the absence of chlorine. Following flushing, the pipe was allowed to set an additional 24 hours.

2.4 AGENCY INVOLVEMENT

The following agencies were involved in the construction of the South Plant Transmission Pipeline, Phase I:

1. SBMWD performed oversight of inspection of the pipeline, purchasing of construction materials, and approving the compaction, hydrostatic, and concrete testing.
2. The City of San Bernardino Public Works Department was responsible for road inspection.

2.5 CHANGE ORDER SUMMARY

El-Co and Trautwein were contracted by SBMWD; therefore, change orders were managed by SBMWD.

2.6 PUNCH LIST ITEMS

Appendix A contains the punch list compiled by SBMWD. El-Co and Trautwein successfully completed each construction contract by completing the punch list items.

2.7 CONCLUSION

The scope of work associated with the South Plant Transmission Pipeline, Phase I, was completed according to the plans and specifications. The pipeline was ready for use pending tie-in's to the extraction wells and to the South Plant by SBMWD.

Appendix A
Construction Inspection Report
South Plant Transmission Pipeline
Phase I and Phase II
Compaction Test Results

C•H•J• INCORPORATED

P.O. Box 231 • 1355 E. Cooley Dr., Colton, CA 92324 • Phone (909) 824-7210 • Fax (909) 824-7209

Job No. _____

********** FAX MESSAGE **********

DATE: 9-17-98 NO. OF PAGES (INC. COVER): 2

TO: URS Greiner FAX NO.: 916-929-7263

ATTENTION: Martha Osborne

FROM: James Cocke FAX NO.: (909) 824-7209

COMMENTS:

DCN 0349 File 13.10.a1
Project No. 62470
CC: _____
PM____ PA/SCM___ SM ___ File_____

FIELD COMPACTION TEST SUMMARY SHEET

Job No. 97722-1
Sheet 1 of 5

PROJECT: URS GREINER, INC. CALIFORNIA - WATER LINE TRENCH BACKFILL AND STREET SUBGRADE AND FINISH GRADE, WATERMAN WATER TREATMENT PLANT, SAN BERNARDINO, CALIFORNIA

Date	Test No.	Location of Test	Depth Of Cut (ft.)	Depth Of Fill (ft.)	Depth Of Test (ft.)	DENSITIES			MC (%)	Soil Type	Remarks or Retest of
						Dry (lbs./ cu. ft.)	Max. (lbs./ cu. ft.)	Rel. (%)			
12/12/97	BF-1	Station 46+00, Elev. 1235.0'			1.0-1.5	107.7	124.0	86	10.5	2	**
	BF-2	Station 51+00, Elev. 1237.4'			0.0-0.5	121.6	124.0	98	9.5	2	
	BF-3	Station 56+00, Elev. 1237.8'			0.0-0.5	121.3	124.0	98	11.2	2	
	BF-4	Station 41+00, Elev. 1237.3'			0.0-0.5	112.8	124.0	91	8.5	2	
12/12/97	SG-1	Station 78+00, Elev. 1237.3'			0.0-0.5	119.7	124.0	97	8.1	2	
	SG-2	Station 1+10, Elev. 1237.4'			0.0-0.5	114.6	124.0	92	10.5	2	
	SG-3	Station 0+59, Elev. 12374.'			0.0-0.5	113.5	124.0	92	6.8	2	
	BF-3	Station 0+10, Elev. 1238.0'			0.0-0.5	112.6	124.0	91	8.1	2	
	BF-6	Station 0+50, Elev. 1238.0'			0.0-0.5	115.0	124.0	93	8.1	2	
	BF-7	Station 1+30, Elev. 1238.0'			0.0-0.5	113.3	124.0	91	8.5	2	
	BF-8	Station 0+70, Elev. 1238.0'			0.0-0.5	120.2	124.0	97	5.9	2	
1/7/98	BF-9	Station 1+15, Elev. 1238.0'			0.0-0.5	117.6	124.0	95	7.0	2	
1/28/98	BF-10	Station 0+53, Riser			0.0-0.5	118.5	124.0	96	9.1	2	
	BF-11	Station 0+88, Riser			0.0-0.5	120.9	124.0	98	9.5	2	
	BF-12	Station 1+00, Riser			0.0-0.5	121.2	124.0	98	8.1	2	
1/29/98	BF-13	Station 1+67, Riser			0.0-0.5	116.4	129.5	90	8.1	3	
	BF-14	Station 1+54, Riser			0.0-0.5	121.4	129.5	94	6.6	3	
2/2/98	BF-15	Station 2+20, Elev. 1238.6'			0.0-0.5	114.8	124.0	93	13.1	2	
	BF-16	Station 2+00, Elev. 1238.6'			0.0-0.5	114.1	124.0	92	8.4	2	
	BF-17	Station 0+5, Elev. 1238.6'			0.0-0.5	111.0	124.0	90	8.9	2	

LEGEND: (SG) Tests on Subgrade Elevation; (BF) Tests on Backfill; (FP) Tests on Fill in Progress; (FG) Tests on Finish Grade Elevation; (MC) Moisture Content; (RX) Rock Corrected; (*) Denotes Failure; (**) Failure, No Retest Requested

FIELD COMPACTION TEST SUMMARY SHEET

PROJECT: URS GREINER, INC. CALIFORNIA - WATER LINE TRENCH BACKFILL AND STREET SUBGRADE AND FINISH GRADE, WATERMAN WATER TREATMENT PLANT, SAN BERNARDINO, CALIFORNIA

Job No. 97722-1
Sheet 1 of 5

Date	Test No.	Location of Test	Depth Of Cut (ft.)	Depth Of Fill (ft.)	Depth Of Test (ft.)	DENSITIES			MC (%)	Soil Type	Remarks or Retest of
						Dry (lbs./ cu. ft.)	Max. (lbs./ cu. ft.)	Rel. (%)			
12/12/98	BF-1	Station 46+00, Elev. 1235.0'			1.0-1.5	107.7	124.0	86	10.5	2	**
	BF-2	Station 51+00, Elev. 1237.4'			0.0-0.5	121.6	124.0	98	9.5	2	
	BF-3	Station 56+00, Elev. 1237.8'			0.0-0.5	121.3	124.0	98	11.2	2	
	BF-4	Station 41+00, Elev. 1237.3'			0.0-0.5	112.8	124.0	91	8.5	2	
12/12/98	SG-1	Station 78+00, Elev. 1237.3'			0.0-0.5	119.7	124.0	97	8.1	2	
	SG-2	Station 1+10, Elev. 1237.4'			0.0-0.5	114.6	124.0	92	10.5	2	
	SG-3	Station 0+59, Elev. 12374.'			0.0-0.5	113.5	124.0	92	6.8	2	
	BF-3	Station 0+10, Elev. 1238.0'			0.0-0.5	112.6	124.0	91	8.1	2	
	BF-6	Station 0+50, Elev. 1238.0'			0.0-0.5	115.0	124.0	93	8.1	2	
	BF-7	Station 1+30, Elev. 1238.0'			0.0-0.5	113.3	124.0	91	8.5	2	
	BF-8	Station 0+70, Elev. 1238.0'			0.0-0.5	120.2	124.0	97	5.9	2	
1/7/98	BF-9	Station 1+15, Elev. 1238.0'			0.0-0.5	117.6	124.0	95	7.0	2	
1/28/98	BF-10	Station 0+53, Riser			0.0-0.5	118.5	124.0	96	9.1	2	
	BF-11	Station 0+88, Riser			0.0-0.5	120.9	124.0	98	9.5	2	
	BF-12	Station 1+00, Riser			0.0-0.5	121.2	124.0	98	8.1	2	
1/29/98	BF-13	Station 1+67, Riser			0.0-0.5	116.4	129.5	90	8.1	3	
	BF-14	Station 1+54, Riser			0.0-0.5	121.4	129.5	94	6.6	3	
2/2/98	BF-15	Station 2+20, Elev. 1238.6'			0.0-0.5	114.8	124.0	93	13.1	2	
	BF-16	Station 2+00, Elev. 1238.6'			0.0-0.5	114.1	124.0	92	8.4	2	
	BF-17	Station 0+5, Elev. 1238.6'			0.0-0.5	111.0	124.0	90	8.9	2	

LEGEND: (SG) Tests on Subgrade Elevation; (BF) Tests on Backfill; (FP) Tests on Fill in Progress; (FG) Tests on Finish Grade Elevation; (MC) Moisture Content; (RX) Rock Corrected; (*) Denotes Failure; (**) Failure, No Retest Requested

FIELD COMPACTION TEST SUMMARY SHEET

PROJECT: URS GREINER, INC. CALIFORNIA - WATER LINE TRENCH BACKFILL AND STREET SUBGRADE AND FINISH GRADE, WATERMAN WATER TREATMENT PLANT, SAN BERNARDINO, CALIFORNIA

Job No. 97722-1
Sheet 2 of 5

Date	Test No.	Location of Test	Depth Of Cut (ft.)	Depth Of Fill (ft.)	Depth Of Test (ft.)	DENSITIES			MC (%)	Soil Type	Remarks or Retest of
						Dry (lbs./ cu. ft.)	Max. (lbs./ cu. ft.)	Rel. (%)			
2/10/98	BF-18	East of Effluent Line, Elev. 1239.4'			0.0-0.5	113.5	124.0	92	12.1	2	
	BF-19	Anti-Siphon Loop, Elev. 1239.4'			0.0-0.5	111.5	124.0	90	6.4	2	
	BF-20	Station 1+18, Elev. 1240.9'			0.0-0.5	118.7	124.0	96	7.7	2	
2/13/98	BF-21	Station 0+20, Elev. 1236.7'			0.0-0.5	120.9	124.0	98	6.7	2	
	BF-22	Station 0+95, Elev. 1238.0'			0.0-0.5	120.5	124.0	97	5.4	2	
	BF-23	Station 0+24, Elev. 1242.5'			0.0-0.5	119.2	124.0	96	13.3	2	
2/18/98	BF-24	Station 1+64, Elev. 1243.0'			0.0-0.5	108.1	124.0	87	16.7	2	* See BF-31
3/2/98	BF-25	Station 0+29, Elev. 1241.0'			0.0-0.5	115.8	124.0	93	12.9	2	
	BF-26	Station 0+59, Elev. 1241.0'			0.0-0.5	121.3	124.0	98	10.7	2	
	BF-27	Station 0+55, Elev. 1241.2'			0.0-0.5	120.3	124.0	97	13.6	2	
	BF-28	Station 1+10, Elev. 1241.0'			0.0-0.5	117.5	124.0	95	12.2	2	
3/3/98	BF-29	Station 2+26, Elev. 1244.0'			0.0-0.5	124.5	124.0	100	7.4	2	
	BF-30	Station 2+16, Elev. 1244.0'			0.0-0.5	123.5	124.0	99	9.7	2	
	BF-31	Station 1+64, Elev. 1243.9'			0.0-0.5	119.3	124.0	99	10.7	2	
3/5/98	SG-4	Station 1+55			0.0-0.5	123.1	124.0	99	6.0	2	
	SG-5	Station 1+12			0.0-0.5	120.5	124.0	97	8.1	2	
	SG-6	Station 0+25			0.0-0.5	118.9	124.0	96	6.9	2	
	SG-7	Station 0+84			0.0-0.5	124.9	124.0	100	5.7	2	
3/13/98	FG-1	Station 1+40, Elev. 1245.0'			0.0-0.5	127.9	135.0	95	10.0	4	
	FG-2	Station 1+70, Elev. 1245.0'			0.0-0.5	128.8	135.0	95	10.5	4	

LEGEND: (SG) Tests on Subgrade Elevation; (BF) Tests on Backfill; (FP) Tests on Fill in Progress; (FG) Tests on Finish Grade Elevation; (MC) Moisture Content; (RX) Rock Corrected; (*) Denotes Failure

FIELD COMPACTION TEST SUMMARY SHEET

CT: URS GREINER, INC. CALIFORNIA - WATER LINE TRENCH BACKFILL AND STREET SUBGRADE AND FINISH GRADE, WATERMAN WATER TREATMENT PLANT, SAN BERNARDINO, CALIFORNIA

Location of Test	Depth Of Cut (ft.)	Depth Of Fill (ft.)	Depth Of Test (ft.)	DENSITIES			MC (%)	Soil Type	Remarks or Retest of
				Dry (lbs./ cu. ft.)	Max. (lbs./ cu. ft.)	Rel. (%)			
tation 2 + 10, Elev. 1245.0'			0.0-0.5	129.9	135.0	96	10.2	4	
tation 1 + 50, Elev. 1244.5'			1.0-1.5	121.4	124.0	98	7.1	2	
tation 1 + 40, Elev. 1244.5'			1.0-1.5	123.0	124.0	99	7.5	2	
tation 2 + 10, Elev. 1245.5'			0.0-0.5	131.7	135.0	98	7.1	4	
tation 1 + 50, Elev. 1245.5'			0.0-0.5	131.8	135.0	98	6.4	4	
tation 1 + 40, Elev. 1244.5'			0.0-0.5	123.1	124.0	99	9.0	2	
tation 1 + 70, Elev. 1244.5'			0.0-0.5	119.6	124.0	97	7.1	2	
tation 1 + 90, Elev. 1244.5'			0.0-0.5	123.8	124.0	99	6.4	2	
tation 1 + 40			0.0-0.5	128.6	135.0	95	7.2	4	
tation 2 + 30			0.0-0.5	123.0	135.0	91	5.0	4	* See FG-8
tation 2 + 30			0.0-0.5	128.7	135.0	95	6.0	4	
tation 0 + 21			0.0-0.5	131.4	135.0	97	5.7	4	
tation 0 + 55			0.0-0.5	127.3	135.0	94	4.7	4	
tation 0 + 80			0.0-0.5	130.2	135.0	97	7.9	4	
tation 0 + 90			0.0-0.5	129.4	135.0	96	7.4	4	
tation 1 + 20			0.0-0.5	124.4	135.0	92	10.0	4	* See FG-14
tation 1 + 20			0.0-0.5	129.6	135.0	96	6.8	4	
tation 2 + 15			0.0-0.5	119.4	123.0	97	9.5	7	
tation 1 + 50			0.0-0.5	118.0	123.0	96	9.1	7	
tation 1 + 40			0.0-0.5	122.8	123.0	100	8.7	7	

Soil Type	Remarks or Retest of
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7	* See FG-32
7	* See FG-31

grade Elevation; (BF) Tests on Backfill; (FP) Tests on Fill in Progress; (FG) Tests on Finish Grade Elevation;
ntent; (RX) Rock Corrected; (*) Denotes Failure

FIELD COMPACTION TEST SUMMARY SHEET

C. CALIFORNIA - WATER LINE TRENCH BACKFILL AND STREET FINISH GRADE, WATERMAN WATER TREATMENT PLANT, SAN ALIFORNIA

ıst	Depth Of Cut (ft.)	Depth Of Fill (ft.)	Depth Of Test (ft.)	DENSITIES			MC (%)
				Dry (lbs./ cu. ft.)	Max. (lbs./ cu. ft.)	Rel. (%)	
			0.0-0.5	122.0	123.0	98	12.2
			0.0-0.5	122.7	123.0	99	12.2
			0.0-0.5	119.1	123.0	97	12.3
			0.0-0.5	113.8	124.0	92	7.0
			0.0-0.5	122.9	123.0	98	8.0
			0.0-0.5	125.0	123.0	100	9.0
			0.0-0.5	122.9	123.0	99	9.0
			0.0-0.5	122.8	123.0	99	9.0
			0.0-0.5	119.8	123.0	97	10.2
			0.0-0.5	117.8	123.0	98	12.2
			0.0-0.5	113.1	123.0	92	20.9
			0.0-0.5	116.3	123.0	95	10.6
			0.0-0.5	123.2	124.0	99	5.8
			0.0-0.5	123.8	124.0	99	6.8
			0.0-0.5	123.5	124.0	97	5.9
			0.0-0.5	117.2	124.0	95	9.4
			0.0-0.5	119.6	124.0	96	10.7
			0.0-0.5	117.4	124.0	94	12.1
			0.0-0.5	113.8	123.0	93	8.1
			0.0-0.5	113.9	123.0	93	8.2

ts on Backfill; (FP) Tests on Fill in Progress; (FG) Tests on Finish Grade Elevation;
d; (*) Denotes Failure

FIELD COMPACTION TEST SUMMARY SHEET

PROJECT: URS GREINER, INC. CALIFORNIA - WATER LINE TRENCH BACKFILL AND STREET SUBGRADE AND FINISH GRADE, WATERMAN WATER TREATMENT PLANT, SAN BERNARDINO, CALIFORNIA

Test No.	Location of Test	Depth Of Cut (ft.)	Depth Of Fill (ft.)	Depth Of Test (ft.)	DENSITIES			MC (%)	Soil Type	Remarks or Retest of
					Dry (lbs./ cu. ft.)	Max. (lbs./ cu. ft.)	Rel. (%)			
G-18	Station 0+40			0.0-0.5	122.0	123.0	98	12.2	7	
G-19	Station 0+80			0.0-0.5	122.7	123.0	99	12.2	7	
G-20	Station 1+10			0.0-0.5	119.1	123.0	97	12.3	7	
G-14	Station 1+13			0.0-0.5	113.8	124.0	92	7.0	2	
G-21	Station 1+15			0.0-0.5	122.9	123.0	98	8.0	7	
G-22	Station 0+80			0.0-0.5	125.0	123.0	100	9.0	7	
G-23	Station 1+15			0.0-0.5	122.9	123.0	99	9.0	7	
G-24	Station 0+75			0.0-0.5	122.8	123.0	99	9.0	7	
G-25	Station 0+28			0.0-0.5	119.8	123.0	97	10.2	7	
G-26	Station 0+48			0.0-0.5	117.8	123.0	98	12.2	7	
G-27	Station 1+00			0.0-0.5	113.1	123.0	92	20.9	7	
G-28	Station 1+15			0.0-0.5	116.3	123.0	95	10.6	7	
G-15	Station 1+12			0.0-0.5	123.2	124.0	99	5.8	2	
G-16	Station 1+00			0.0-0.5	123.8	124.0	99	6.8	2	
G-17	Station 0+16			0.0-0.5	123.5	124.0	97	5.9	2	
G-18	Station 0+00			0.0-0.5	117.2	124.0	95	9.4	2	
G-19	Station 0+81			0.0-0.5	119.6	124.0	96	10.7	2	
G-20	Station 1+30			0.0-0.5	117.4	124.0	94	12.1	2	
G-29	Drive Approach			0.0-0.5	113.8	123.0	93	8.1	7	* See FG-32
G-30	Station 2+00			0.0-0.5	113.9	123.0	93	8.2	7	* See FG-31

Tests on Subgrade Elevation; (BF) Tests on Backfill; (FP) Tests on Fill in Progress; (FG) Tests on Finish Grade Elevation; Moisture Content; (RX) Rock Corrected; (*) Denotes Failure

COMPACTION TEST SUMMARY SHEET

Job

.IFORNIA - WATER LINE TRENCH BACKFILL AND STREET
I GRADE, WATERMAN WATER TREATMENT PLANT, SAN
NIA

	Depth Of Cut (ft.)	Depth Of Fill (ft.)	Depth Of Test (ft.)	DENSITIES			MC (%)	Soil Type
				Dry (lbs./ cu. ft.)	Max. (lbs./ cu. ft.)	Rel. (%)		
			0.0-0.5	116.5	123.0	95	10.8	7
			0.0-0.5	117.8	123.0	96	9.8	7
			0.0-0.5	118.8	123.0	97	9.8	7
			0.0-0.5	118.6	123.0	96	10.7	7
			0.0-0.5	116.9	123.0	95	10.8	7
			0.0-0.5	117.2	123.0	95	10.2	7
			0.0-0.5	133.4	139.5	96	5.3	7
			0.0-0.5	134.4	139.5	96	6.3	10
			0.0-0.5	133.3	139.5	96	5.6	10
			0.0-0.5	134.0	139.5	96	4.3	10
			0.0-0.5	134.6	139.5	96	5.1	10

ckfill; (FP) Tests on Fill in Progress; (FG) Tests on Finish Grade Elevation;
)enotes Failure

FIELD COMPACTION TEST SUMMARY SHEET

PROJECT: URS GREINER, INC. CALIFORNIA - WATER LINE TRENCH BACKFILL AND STREET SUBGRADE AND FINISH GRADE, WATERMAN WATER TREATMENT PLANT, SAN BERNARDINO, CALIFORNIA

Job No. 97722-1
Sheet 5 of 5

Date	Test No.	Location of Test	Depth Of Cut (ft.)	Depth Of Fill (ft.)	Depth Of Test (ft.)	DENSITIES			MC (%)	Soil Type	Remarks or Retest of
						Dry (lbs./ cu. ft.)	Max. (lbs./ cu. ft.)	Rel. (%)			
6/12/98	FG-31	Station 2+20			0.0-0.5	116.5	123.0	95	10.8	7	
	FG-32	Drive Approach			0.0-0.5	117.8	123.0	96	9.8	7	
	FG-33	Station 1+95			0.0-0.5	118.8	123.0	97	9.8	7	
	FG-34	Station 1+80			0.0-0.5	118.6	123.0	96	10.7	7	
	FG-35	Parking Lot, Southeast Portion			0.0-0.5	116.9	123.0	95	10.8	7	
	FG-36	Parking Lot, East Portion			0.0-0.5	117.2	123.0	95	10.2	7	
	FG-39	Parking Lot, North Portion			0.0-0.5	133.4	139.5	96	5.3	7	
	FG-38	Parking Lot, Center Portion			0.0-0.5	134.4	139.5	96	6.3	10	
	FG-39	Parking Lot, Center Portion			0.0-0.5	133.3	139.5	96	5.6	10	
	FG-40	Parking Lot, West Portion			0.0-0.5	134.0	139.5	96	4.3	10	
	FG-41	Parking Lot, Southwest Portion			0.0-0.5	134.6	139.5	96	5.1	10	

LEGEND: (SG) Tests on Subgrade Elevation; (BF) Tests on Backfill; (FP) Tests on Fill in Progress; (FG) Tests on Finish Grade Elevation; (MC) Moisture Content; (RX) Rock Corrected; (*) Denotes Failure

FIELD COMPACTION TEST SUMMARY SHEET

PROJECT: URS GREINER, INC. CALIFORNIA - WATER LINE TRENCH BACKFILL, WESTERN AVENUE, SAN BERNARDINO, CALIFORNIA

Job No. 97722-1
Sheet 1 of 1

Date	Test No.	Location of Test	Depth Of Cut (ft.)	Depth Of Fill (ft.)	Depth Of Test (ft.)	DENSITIES			MC (%)	Soil Type	Remarks or Retest of
						Dry (lbs./ cu. ft.)	Max. (lbs./ cu. ft.)	Rel. (%)			
4/29/98	BF-1	Western Avenue, Station 16 + 30		6.0	3.0-3.5	111.0	124.0	9	6.8	2	
	BF-2	Western Avenue, Station 13 + 00		14.0	7.0-7.5	119.2	124.0	96	11.0	2	
5/12/98	BF-3	Western Avenue, Station 17 + 00		10.0	4.0-4.5	116.5	124.0	94	8.4	2	
	BF-4	Western Avenue, Station 14 + 00		7.0	3.0-3.5	116.1	124.0	94	11.4	2	
	BF-5	Western Avenue, Station 13 + 25		7.0	3.0-3.5	111.6	124.0	90	8.1	2	
	BF-6	Western Avenue, Station 12 + 60		7.0	3.0-3.5	118.7	124.0	96	7.9	2	
	BF-7	Channel Crossing, W. Side			2.0-2.5	119.0	124.0	96	7.3	2	
	BF-8	Channel Crossing, E. Side			2.0-2.5	119.0	124.0	96	8.2	2	
	BF-9	Western Avenue, E. Side, Station 19 + 50		5.0	2.0-2.5	115.5	124.0	93	9.7	2	
	BF-10	Western Avenue, E. Side, Station 20 + 00		4.0	2.0-2.5	119.6	124.0	96	9.2	2	
	BF-11	Western Avenue, E. Side, Station 21 + 50		6.0	3.0-3.5	121.3	124.0	98	8.2	2	
	BF-12	Western Avenue, E. Side, Station 23 + 25		8.0	4.0-4.5	115.6	124.0	90	4.5	2	
	BF-13	Western Avenue, E. Side, Station 23 + 30		8.0	2.0-2.5	118.4	124.0	96	7.0	2	

LEGEND: (SG) Tests on Subgrade Elevation; (BF) Tests on Backfill; (FP) Tests on Fill in Progress; (FG) Tests on Finish Grade Elevation; (MC) Moisture Content; (RX) Rock Corrected; (*) Denotes Failure

FIELD COMPACTION TEST SUMMARY SHEET

PROJECT: URS GREINER, INC. CALIFORNIA - DRAINAGE TRENCH FINISH GRADE, WATER TREATMENT PLANT, RESERVOIR DRIVE, SAN BERNARDINO, CALIFORNIA

Job No. 97722-1
Sheet 1 of 1

Date	Test No.	Location of Test	Depth Of Cut (ft.)	Depth Of Fill (ft.)	Depth Of Test (ft.)	DENSITIES			MC (%)	Soil Type	Remarks or Retest of
						Dry (lbs./ cu. ft.)	Max. (lbs./ cu. ft.)	Rel. (%)			
1/29/98	FG-1	Side Drainage Trench N., Station 0+20			0.0-0.5	134.1	135.0	99	6.7	4	
	FG-2	Side Drainage Trench N., Station 0+50			0.0-0.5	132.9	135.0	98	5.8	4	
	FG-3	Side Drainage Trench N., Station 0+92			0.0-0.5	129.6	135.0	96	5.9	4	
1/30/98	FG-4	Drainage Trench N., Station 0+18			0.0-0.5	133.1	135.0	98	5.3	4	
	FG-5	Drainage Trench N., Station 0+47			0.0-0.5	130.8	135.0	96	5.6	4	
	FG-6	Drainage Trench N., Station 0+93			0.0-0.5	135.5	135.0	100	4.8	4	
2/2/98	FG-7	Drainage Trench S., Station 0+20			0.0-0.5	121.5	124.0	98	6.8	2	
	FG-8	Drainage Trench S., Station 0+8			0.0-0.5	124.0	124.0	100	6.6	2	
	FG-9	Drainage Trench S., Station 0+50			0.0-0.5	121.8	124.0	98	4.8	2	
	FG-10	Drainage Trench S., Station 1+20			0.0-0.5	121.5	109.0	98	6.0	2	

LEGEND: (SG) Tests on Subgrade Elevation; (BF) Tests on Backfill; (FP) Tests on Fill in Progress; (FG) Tests on Finish Grade Elevation; (MC) Moisture Content; (RX) Rock Corrected; (*) Denotes Failure

FIELD COMPACTION TEST SUMMARY SHEET

PROJECT: URS GREINER, INC. CALIFORNIA - STREET SUBGRADE OVER WATER LINE TRENCH BACKFILL, WESTERN AVENUE, SAN BERNARDINO, CALIFORNIA

Job No. 97722-1
Sheet 1 of 1

Date	Test No.	Location of Test	Depth Of Cut (ft.)	Depth Of Fill (ft.)	Depth Of Test (ft.)	DENSITIES			MC (%)	Soil Type	Remarks or Retest of
						Dry (lbs./ cu. ft.)	Max. (lbs./ cu. ft.)	Rel. (%)			
5/15/98	SG-1	Western Avenue, Station 13+00			0.0-0.5	124.1	127.0	98	8.2	5	
	SG-2	Western Avenue, Station 14+10			0.0-0.5	126.5	127.0	99	7.5	5	
	SG-3	Western Avenue, Station 15+10			0.0-0.5	126.9	127.0	99	8.5	5	
	SG-4	Western Avenue, Station 16+35			0.0-0.5	125.8	127.0	99	6.3	5	
	SG-5	Western Avenue, Station 17+89			0.0-0.5	121.9	127.0	96	6.4	5	
	SG-6	Western Avenue, Station 18+05			0.0-0.5	125.8	127.0	99	8.9	5	
	SG-7	Western Avenue, Station 19+25			0.0-0.5	125.0	127.0	98	9.0	5	
	SG-8	Western Avenue, Station 20+30			0.0-0.5	126.8	127.0	99	7.5	5	
	SG-9	Western Avenue, Station 22+25			0.0-0.5	125.9	127.0	99	10.0	5	

LEGEND: (SG) Tests on Subgrade Elevation; (BF) Tests on Backfill; (FP) Tests on Fill in Progress; (FG) Tests on Finish Grade Elevation; (MC) Moisture Content; (RX) Rock Corrected; (*) Denotes Failure

FIELD COMPACTION TEST SUMMARY SHEET

PROJECT: URS GREINER, INC. CALIFORNIA - WATER LINE TRENCH BACKFILL AND FINISH GRADE, MOUNTAIN VIEW AVENUE, SAN BERNARDINO, CALIFORNIA

Job No. 97722-1
Sheet 1 of 1

Date	Test No.	Location of Test	Depth Of Cut (ft.)	Depth Of Fill (ft.)	Depth Of Test (ft.)	DENSITIES			MC (%)	Soil Type	Remarks or Retest of
						Dry (lbs./ cu. ft.)	Max. (lbs./ cu. ft.)	Rel. (%)			
6/4/98	BF-1	Mt. View, S. of 30 Freeway		2.0	0.0-0.5	121.3	124.0	98	8.5	2	
6/7/98	FG-1	Mt. View, S. of 30 Freeway			0.0-0.5	118.4	123.0	96	10.9	7	
	BF-2	Mt. View at 30th Street		4.5	1.5-2.0	115.7	124.0	93	12.0	2	
	FG-2	Mt. View at 30th Street			0.0-0.5	119.2	123.0	97	11.7	7	

LEGEND: (SG) Tests on Subgrade Elevation; (BF) Tests on Backfill; (FP) Tests on Fill in Progress; (FG) Tests on Finish Grade Elevation; (MC) Moisture Content; (RX) Rock Corrected; (*) Denotes Failure

C • H • J • INCORPORATED

P.O. Box 231 • 1355 E. Cooley Dr., Colton, CA 92324 • Phone (909) 824-7210 • Fax (909) 824-7209

Job No. 97722-1

********** FAX MESSAGE **********

DATE: 9-16-98 NO. OF PAGES (INC. COVER): 17

TO: URS Greiner FAX NO.: 916-929-7263

ATTENTION: Martha Adams

FROM: James Cooke FAX NO.: (909) 824-7209

COMMENTS:

FIELD C

PROJECT: URS GREINER, INC. (
WATER TREATMENT

Date	Test No.	Location of Test
11/4/97	BF-1	Water Line, East Portion
	BF-2	Water Line, Center Portion
12/3/97	BF-3	Water Line, East Portion
	BF-4	Water Line, Center Portion
	BF-5	Water Line South Portion
	BF-6	Water Line, South Center Portion
12/16/97	BF-7	Water Line, Northwest Portion
	BF-8	Water Line, Center West Portion
	BF-9	Water Line, Southwest Portion
12/19/97	BF-10	Water Line, East Portion
	BF-11	Water Line, Center Portion
	BF-12	Water Line, West Portion
	BF-13	Water Line, East Portion, Station 1 + 15
1/6/98	BF-14	Station 1+23, Elev. 1409.2'
	BF-15	Station 0+90, Elev. 1407.5'
	BF-16	Station 0+15, Elev. 1407.5'
	BF-17	Station 0+15, Elev. 1408.7'
1/9/98	BF-18	Station 0+5, Elev. 1409.0'
	BF-19	Station 0+15, Elev. 1409.7'
	BF-20	Station 0+15, Elev 1409.0'

LEGEND: (SSG) Tests on Subgrade Elevation; (BF) Tests on Backfill; (F
(MC) Moisture Content; (RX) Rock Corrected; (*) Denotes F

OMPACTION TEST SUMMARY SH[redacted]EET

Job No. 97722-1
Sheet 1 of 2

CALIFORNIA - WATER LINE TRENCH BA CKFILL,
PLANT, RESERVOIR DRIVE, SAN BERN ARDINO, CA LIFORNIA

	Depth Of Cut (ft.)	Depth Of Fill (ft.)	Depth Of Test (ft.)	DENSITIES Dry (lbs./ cu. ft.)	Max. (lbs./ cu. ft.)	Rel. (%)	MC (%)	Soil Type	Remarks or Retest of
		5.0	2.0-3.0	114.7	132.0	87	7.5	1	R.X. 15%, See BF-3
		5.0	0.0-1.0	121.2	132.0	92	8.5	1	R.X. 15%, See BF-4
		9.0	6.0-6.5	124.8	129.0	96	9.5	1	R.X. 5%
		9.0	4.0-4.5	126.0	130.5	97	11.0	1	R.X. 10%
		9.0	4.0-4.5	123.1	129.5	95	12.5	3	
		9.0	2.0-2.5	122.8	129.5	95	12.0	3	
		9.0	9.0-9.5	125.1	129.5	97	9.5	3	
		9.0	9.0-9.5	124.3	129.5	96	8.2	3	
		9.0	9.0-9.5	127.9	129.5	98	7.5	3	
		9.0	9.0-9.5	116.5	129.5	90	9.0	3	
		9.0	9.0-9.5	120.7	129.5	93	9.2	3	
		9.0	9.0-9.5	126.7	129.5	98	9.0	3	
		9.0		120.4	129.5	93	8.9	3	
				117.0	129.5	90	10.6	3	
				110.0	129.0	85	12.5	3	* See BF-30
				126.2	129.5	97	8.3	3	
				127.9	129.5	99	7.8	3	
				118.5	129.5	91	5.8	3	
				125.2	129.5	97	5.9	3	
				118.4	129.5	91	7.6	3	

P) Tests on Fill in Progress; (FG) Tests on Fi[redacted]ish Grade Ele[redacted]tion;
Failure

FIELD COMPACTION TEST SUMMARY SHEET

PROJECT: URS GREINER, INC. CALIFORNIA - WATER LINE TRENCH BACKFILL, WATER TREATMENT PLANT, RESERVOIR DRIVE, SAN BERNARDINO, CALIFORNIA

Job No. 97722-1
Sheet 2 of 2

Date	Test No.	Location of Test	Depth Of Cut (ft.)	Depth Of Fill (ft.)	Depth Of Test (ft.)	DENSITIES			MC (%)	Soil Type	Remarks or Retest of
						Dry (lbs./ cu. ft.)	Max. (lbs./ cu. ft.)	Rel. (%)			
1/9/98	BF-21	Station 0 + 25, Elev. 1409.0'				112.9	129.5	86	8.5	3	* See BF-22
1/12/98	BF-22	Station 0 + 05, Elev. 1408.0'				130.4	129.5	100	7.5	3	
	BF-23	Station 0 + 64, Elev. 1408.0'				125.9	129.5	97	5.3	3	
	BF-24	Station 0 + 30, Elev. 1408.0'				123.5	129.5	95	6.9	3	
	BF-25	Station 0 + 55, Elev. 1406.0'				129.5	129.5	100	7.0	3	
	BF-26	Station 0 + 83, Elev. 1406.0'				124.4	129.5	96	5.0	3	
1/13/98	BF-27	Station 0 + 50, Elev. 1406.0'				120.4	129.5	93	9.4	3	
	BF-28	Station 0 + 33, Elev. 1406.0'				121.6	129.5	94	9.7	3	
	BF-29	Station 0 + 45, Elev. 1406.0'				121.9	129.5	94	10.9	3	
1/16/98	BF-30	Station 0 + 90, Elev. 1407.5'				128.9	129.5	100	12.1	3	
	BF-31	Station 0 + 90, Elev. 1407.5'				128.8	129.5	100	10.5	3	
1/20/98	BF-32	Station 0 + 30, Elev. 1409.5'				113.1	129.5	87	10.3	3	* See BF-33
	BF-33	Station 0 + 30, Elev. 1409.5'				123.3	129.5	95	10.3	3	
1/22/98	BF-34	Station 0 + 40, Elev. 1410.6'				122.8	129.5	95	9.6	3	
	BF-35	Elev. 1410.0'				116.2	129.5	91	11.5	3	
1/26/98	BF-36	Station 0 + 15, Elev. 1410.5'				122.3	127.5	94	7.6	3	
	BF-37	Station 1 + 02, Elev. 1410.5'				117.8	127.5	91	9.0	3	
	BF-38	Station 1 + 16, Elev. 1410.5'				123.7	127.5	95	8.0	3	
1/27/98	BF-39	Station 0 + 68, Elev. 1410.5'				124.6	124.0	100	9.3	2	

LEGEND: (SG) Tests on Subgrade Elevation; (BF) Tests on Backfill; (FP) Tests on Fill in Progress; (FG) Tests on Finish Grade Elevation; (MC) Moisture Content; (RX) Rock Corrected; (*) Denotes Failure

FIELD COMPACTION TEST SUMMARY SHEET

PROJECT: URS GREINER, INC. CALIFORNIA - PAD FILL-IN-PROGRESS, WATER TREATMENT PLANT, RESERVOIR DRIVE, SAN BERNARDINO, CALIFORNIA

Job No. 97722-1
Sheet 1 of 5

Date	Test No.	Location of Test	Depth Of Cut (ft.)	Depth Of Fill (ft.)	Depth Of Test (ft.)	DENSITIES			MC (%)	Soil Type	Remarks or Retest of
						Dry (lbs./ cu. ft.)	Max. (lbs./ cu. ft.)	Rel. (%)			
12/30/97	FP-1	Station 0 + 30, Elev. 1407.4'			0.0-0.5	111.7	129.5	85	6.5	3	* See FP-6
	FP-2	Station 0 + 90, Elev. 1407.4'			0.0-0.5	113.0	129.5	86	6.5	3	* See FP-7
	FP-3	Station 1 + 00, Elev. 1406.7'			0.0-0.5	111.0	129.5	86	6.5	3	* See FP-4
	FP-4	Station 0 + 90, Elev. 1406.5'			0.0-0.5	126.7	129.5	98	8.5	3	
	FP-5	Station 0 + 90, Elev. 1406.2'			0.0-0.5	127.6	129.5	98	8.4	3	
12/31/97	FP-6	Station 0 + 30, Elev. 1407.4'			0.0-0.5	128.5	129.5	99	10.6	3	
	FP-7	Station 0 + 90, Elev. 1407.4'			0.0-0.5	124.3	129.5	96	9.0	3	
1/5/98	FP-8	Station 0 + 10, Elev. 1407.7'			0.0-0.5	125.3	129.5	97	7.8	3	
	FP-9	Station 0 + 50, Elev. 1407.7'			0.0-0.5	128.3	129.5	98	8.1	3	
	FP-10	Station 0 + 90, Elev. 1406.5'			0.0-0.5	116.8	129.5	90	12.0	3	* See FP-14
	FP-11	Station 0 + 90, Elev. 1408.3'			0.0-0.5	125.1	129.5	97	7.7	3	
	FP-12	Station 0 + 90, Elev. 1407.0'			0.0-0.5	118.4	129.5	91	7.0	3	
	FP-13	Station 0 + 90, Elev. 1406.8'			0.0-0.5	122.1	129.5	95	7.5	3	
1/6/98	FP-14	Station 0 + 85, Elev. 1406.0'			0.0-0.5	130.5	129.5	100	7.3	3	
	FP-15	Station 0 + 95, Elev. 1406.0'			0.0-0.5	126.7	129.5	97	10.2	3	
1/7/98	FP-16	Station 0 + 80, Elev. 1408.2'			0.0-0.5	124.3	129.5	96	8.6	3	
	FP-17	Station 0 + 31, Elev. 1408.0'			0.0-0.5	124.0	129.5	96	10.5	3	
	FP-18	Station 1 + 20, Elev. 1408.0'			0.0-0.5	118.0	129.5	91	11.0	3	* See FP-19
1/8/98	FP-19	Station 1 + 20, Elev. 1408.0'			0.0-0.5	127.2	129.5	98	9.0	3	
	FP-20	Station 1 + 20, Elev. 1409.2'			0.0-0.5	125.3	129.5	92	7.0	3	

LEGEND: (SG) Tests on Subgrade Elevation; (BF) Tests on Backfill; (FP) Tests on Fill in Progress; (FG) Tests on Finish Grade Elevation; (MC) Moisture Content; (RX) Rock Corrected; (*) Denotes Failure

FIELD COMPACTION TEST SUMMARY SHEET

PROJECT: URS GREINER, INC. CALIFORNIA - PAD FILL-IN-PROGRESS, WATER TREATMENT PLANT, RESERVOIR DRIVE, SAN BERNARDINO, CALIFORNIA

Job No. 97722-1
Sheet 2 of 5

Date	Test No.	Location of Test	Depth Of Cut (ft.)	Depth Of Fill (ft.)	Depth Of Test (ft.)	DENSITIES			MC (%)	Soil Type	Remarks or Retest of
						Dry (lbs./ cu. ft.)	Max. (lbs./ cu. ft.)	Rel. (%)			
1/8/98	FP-21	Station 0+56, Elev. 1408.8'			0.0-0.5	124.0	129.5	96	7.1	3	
1/12/98	FP-22	Station 0+25, Elev. 1409.0'			0.0-0.5	121.7	129.5	94	12.5	3	* See FP-31
1/15/98	FP-23	Station 0+46, Elev. 1408.5'			0.0-0.5	123.4	129.5	95	9.5	3	
	FP-24	Station 0+52, Elev. 1408.5'			0.0-0.5	125.5	129.5	97	8.2	3	
1/16/98	FP-25	Station 1+20, Elev. 1409.0'			0.0-0.5	125.6	129.5	97	5.5	3	
1/20/98	FP-26	Station 0+60, Elev. 1409.0'			0.0-0.5	118.0	129.5	91	10.5	3	* See FP-27
	FP-27	Station 0+60, Elev. 1409.0'			0.0-0.5	120.1	129.5	93	10.5	3	
1/20/98	FP-28	Station 0+30, Elev. 1411.0'			0.0-0.5	117.6	129.5	91	9.5	3	* See FP-31
	FP-29	Station 0+30, Elev. 1411.0'			0.0-0.5	121.4	129.5	94	9.0	3	* See FP-31
1/22/98	FP-30	Station 1+10, Elev. 1410.0'			0.0-0.5	126.2	129.5	97	7.4	3	
	FP-31	Station 0+50, Elev. 1408.6'			0.0-0.5	122.8	129.5	95	7.9	3	
	FP-32	Station 0+15, Elev. 1410.0'			0.0-0.5	124.5	129.5	96	10.8	3	
	FP-33	Station 0+20, Elev. 1410.0'			0.0-0.5	122.6	129.5	95	8.3	3	
	FP-34	Station 1+30, Elev. 1411.7'			0.0-0.5	128.0	129.5	99	8.7	3	
	FP-35	Station 0+80, Elev. 1411.7'			0.0-0.5	120.6	129.5	93	11.6	3	* See FP-36
	FP-36	Station 1+00, Elev. 1411.7'			0.0-0.5	126.8	129.5	98	7.5	3	
	FP-37	Station 1+20, Elev. 1410.0'			0.0-0.5	121.8	129.5	94	9.2	3	* See FP-43
	FP-38	Station 0+80, Elev. 1410.0'			0.0-0.5	118.7	129.5	92	11.5	3	* See FP-40
	FP-39	Station 0+50, Elev. 1410.0'			0.0-0.5	129.5	129.5	100	8.3	3	
1/22/98	FP-40	Station 0+95, Elev. 1410.0'			0.0-0.5	123.5	129.5	95	9.5	3	

LEGEND: (SG) Tests on Subgrade Elevation; (BF) Tests on Backfill; (FP) Tests on Fill in Progress; (FG) Tests on Finish Grade Elevation; (MC) Moisture Content; (RX) Rock Corrected; (*) Denotes Failure

FIELD COMPACTION TEST SUMMARY SHEET

PROJECT: URS GREINER, INC. CALIFORNIA - PAD FILL-IN-PROGRESS, WATER TREATMENT PLANT, RESERVOIR DRIVE, SAN BERNARDINO, CALIFORNIA

Job No. 97722-1
Sheet 3 of 5

Date	Test No.	Location of Test	Depth Of Cut (ft.)	Depth Of Fill (ft.)	Depth Of Test (ft.)	DENSITIES			MC (%)	Soil Type	Remarks or Retest of
						Dry (lbs./ cu. ft.)	Max. (lbs./ cu. ft.)	Rel. (%)			
1/26/98	FP-41	Station 1+20, Elev. 1410.53'			0.0-0.5	133.4	135.0	99	6.3	4	
	FP-42	Station 0+30, Elev. 1410.53'			0.0-0.5	129.1	135.0	96	5.9	4	
	FP-43	Station 1+26, Elev. 1410.53'			0.0-0.5	125.6	129.5	96	8.5	3	
	FP-44	Station 0+70, Elev. 1410.53'			0.0-0.5	126.5	129.5	97	9.4	3	
	FP-45	Station 0+35, Elev. 1410.53'			0.0-0.5	128.9	135.0	95	7.4	4	
	FP-46	Station 0+35, Elev. 1410.53'			0.0-0.5	127.9	135.0	95	6.7	4	
	FP-47	Station 0+50, Elev. 1410.53'			0.0-0.5	128.5	136.0	95	6.6	4	
	FP-48	Station 0+50, Elev. 1410.53'			0.0-0.5	130.8	135.0	97	6.8	4	
1/26/98	FP-49	Station 1+20, Elev. 1411.0'			0.0-0.5	127.0	129.5	98	8.8	3	
	FP-50	Station 1+10, Elev. 1411.0'			0.0-0.5	125.8	129.5	97	8.9	3	
	FP-51	Station 1+20, Elev. 1411.0'			0.0-0.5	118.8	129.5	92	12.7	3	* See FP-55
	FP-52	Station 1+20, Elev. 1411.0'			0.0-0.5	117.8	129.5	91	11.6	3	* See FP-55
	FP-53	Station 0+60, Elev. 1411.0'			0.0-0.5	121.3	129.5	94	8.2	3	
	FP-54	Station 0+60, Elev. 1411.0'			0.0-0.5	122.1	129.5	95	9.7	3	
	FP-55	Station 0+90, Elev. 1411.0'			0.0-0.5	122.8	129.5	95	10.6	3	
	FP-56	Station 0+90, Elev. 1411.0'			0.0-0.5	124.2	129.5	96	11.7	3	
	FP-57	Station 0+20, Elev. 1411.0'			0.0-0.5	117.9	129.5	91	13.0	3	* See FP-69
1/27/98	FP-58	Station 0+16, Elev. 1411.1'			0.0-0.5	123.2	129.5	92	6.2	3	* See FP-63
	FP-59	Station 0+16, Elev. 1411.1'			0.0-0.5	125.1	129.5	94	6.1	3	* See FP-64
	FP-60	Station 0+53, Elev 1411.1'			0.0-0.5	123.9	129.5	93	7.2	3	* See FP-65

LEGEND: (SG) Tests on Subgrade Elevation; (BF) Tests on Backfill; (FP) Tests on Fill in Progress; (FG) Tests on Finish Grade Elevation; (MC) Moisture Content; (RX) Rock Corrected; (*) Denotes Failure

FIELD COMPACTION TEST SUMMARY SHEET

PROJECT: URS GREINER, INC. CALIFORNIA - PAD FILL-IN-PROGRESS, WATER TREATMENT PLANT, RESERVOIR DRIVE, SAN BERNARDINO, CALIFORNIA

Date	Test No.	Location of Test	Depth Of Cut (ft.)	Depth Of Fill (ft.)	Depth Of Test (ft.)	DENSITIES			MC (%)	Soil Type	Remarks or Retest of
						Dry (lbs./ cu. ft.)	Max. (lbs./ cu. ft.)	Rel. (%)			
1/27/98	FP-61	Station 0+16, Elev. 1411.1'			0.0-0.5	131.9	135.0	97	7.6	4	
	FP-62	Station 0+40, Elev. 1411.1'			0.0-0.5	131.9	135.0	97	7.0	4	
	FP-63	Station 0+53, Elev. 1411.1'			0.0-0.5	131.6	135.0	97	6.8	4	
	FP-64	Station 1+20, Elev. 1410.6'			0.0-0.5	129.7	135.0	96	5.1	4	
	FP-65	Station 1+25, Elev. 1410.2'			0.0-0.5	130.5	135.0	96	4.7	4	
	FP-66	Station 0+54, Elev. 1410.2'			0.0-0.5	129.3	135.0	95	5.8	4	
	FP-67	Station 0+12, Elev. 1410.3'			0.0-0.5	130.8	135.0	97	7.4	4	
1/28/98	FP-68	Station 1+08, Elev. 1410.8'			0.0-0.5	129.6	135.0	96	8.4	4	
	FP-69	Station 0+80, Elev. 1410.8'			0.0-0.5	129.3	135.0	96	9.1	4	
	FP-70	Station 0+75, Elev. 1411.0'			0.0-0.5	129.6	135.0	96	6.2	1	
	FP-71	Station 0+49, Elev. 1411.0'			0.0-0.5	128.3	135.0	95	4.6	4	
1/29/98	FP-72	Station 0+16, Elev. 1411.0'			0.0-0.5	128.1	135.0	95	5.0	4	
	FP-73	Station 0+44, Elev. 1411.0'			0.0-0.5	134.9	135.0	99	6.2	4	
	FP-74	Station 0+97, Elev. 1411.0'			0.0-0.5	139.4	135.0	99	6.6	4	
	FP-75	Station 1+20, Elev. 1411.0'			0.0-0.5	129.0	135.0	95	7.3	4	
	FP-76	Station 0+90, Elev. 1411.0'			0.0-0.5	132.1	135.0	97	5.5	4	
	FP-77	Station 0+39, Elev. 1411.0'			0.0-0.5	133.4	135.0	98	4.8	4	
	FP-78	Station 0+14, Elev. 1411.0'			0.0-0.5	131.3	135.5	97	6.6	4	
2/2/98	FP-79	Station 0+16, Elev. 1408.4'			0.0-0.5	126.7	135.5	94	8.2	4	
	FP-80	Station 0+55, Elev. 1408.9'			0.0-0.5	130.5	135.5	98	4.9	4	

LEGEND: (SG) Tests on Subgrade Elevation; (BF) Tests on Backfill; (FP) Tests on Fill in Progress; (FG) Tests on Finish Grade Elevation; (MC) Moisture Content; (RX) Rock Corrected; (*) Denotes Failure

FIELD COMPACTION TEST SUMMARY SHEET

PROJECT: URS GREINER, INC. CALIFORNIA - PAD FILL-IN-PROGRESS, WATER TREATMENT PLANT, RESERVOIR DRIVE, SAN BERNARDINO, CALIFORNIA

Job No. 97722-1
Sheet 5 of 5

Date	Test No.	Location of Test	Depth Of Cut (ft.)	Depth Of Fill (ft.)	Depth Of Test (ft.)	DENSITIES			MC (%)	Soil Type	Remarks or Retest of
						Dry (lbs./ cu. ft.)	Max. (lbs./ cu. ft.)	Rel. (%)			
2/02/98	FP-81	Station 1 + 18, Elev. 1409.1'			0.0-0.5	130.6	135.5	96	6.8	4	
	FP-82	Station 1 + 18, Elev. 1408.0'			0.0-0.5	129.9	135.5	96	5.7	4	

LEGEND: (SG) Tests on Subgrade Elevation; (BF) Tests on Backfill; (FP) Tests on Fill in Progress; (FG) Tests on Finish Grade Elevation; (MC) Moisture Content; (RX) Rock Corrected; (*) Denotes Failure

C·M·J· INCORPORATED

P.O. Box 231 • 1355 E. Cooley Drive, Colton, CA 92324 • Phone (909) 824-7210

No 45074

INVOICE

To: City of San Bernardino Water Dept.
Attn: Mr. William Bryden
P.O. Box 710
San Bernardino, CA 92402

PROJECT
11th Street & Mt. View Ave.
San Bernardino, CA

WR

DATE	JOB NO.	CUSTOMER'S P.O NO
12/31/96	96483-1	

QUANTITY	DESCRIPTION	UNIT PRICE	AMOUNT
9	Compaction Tests	$ 30.00	$ 270.00
1	Moisture Density Curve	110.00	110.00
1/4	Principal Engineer Hour	115.00	28.75
1/2	Senior Staff Engineer Hour	75.00	37.50
1/2	Typing Hour	30.00	15.00
	Amount Due:		$ 461.25

work complete
ghw 1/9/97

OK jp 1-13-97

CO NO 5273

Overdue accounts will be charged a late payment fee
of 1% per month (12% annually)

December 27, 1996

City of San Bernardino Water Department
P.O. Box 710
San Bernardino, California 92402
Attention: Mr. James Dye

Job No. 96483-1

Subject: Compaction Report
Street Finish Grade over Water Line Trench
Sierra Way and 11th Street
San Bernardino, California

Dear Mr. Dye:

This report covers the results of in-place density tests taken to date on the street finish grade over water line trench at the above referenced location.

All tests were taken in coordination with and as requested by the client's representative.

FIELD PROCEDURE:

A total of nine in-place density tests were taken by the nuclear method between December 12 and December 17, 1996. A representative sample of the soil encountered was returned to the laboratory for determination of the Optimum Moisture Content - Maximum Dry Density curve.

The locations of the in-place density tests are indicated on the attached Field Compaction Test Summary Sheet.

OPTIMUM MOISTURE - MAXIMUM DENSITY RELATION:

ASTM D 1557-78

Soil Type	Classification	Optimum Moisture (Percent)	Maximum Dry Density (PCF)
3	Sandy Gravel, fine to medium with coarse, gravel to 3/4", gray (GP) base material	7.0	132.0

RESULTS:

The results of the in-place density tests taken to date, and the relative compaction in each case, are shown on the attached Field Compaction Test Summary Sheet.

LIMITATIONS:

C.H.J., Incorporated has striven to perform our services within the limits prescribed by our client, and in a manner consistent with the usual thoroughness and competence of reputable soils engineers practicing under similar circumstances. No other representation, express or implied, and no warranty or guarantee is included or intended by virtue of the services performed or reports, opinion, documents, or otherwise supplied.

This report reflects the testing conducted on the site as the site existed during the street finish grade over water line trench testing, which is the subject of this report. However, changes in conditions can occur with the passage of time, due to natural processes or the works of man on this or adjacent properties. Changes in applicable or appropriate standards may also occur whether as a result of legislation, application, or the broadening of knowledge. Therefore, this report is indicative of only those conditions tested at the time testing was performed, and the findings of this report may be invalidated fully or partially by changes outside of the control of C.H.J., Incorporated. This report should not be relied upon after a period of one year.

The test results presented herein represent an independent sample of the compaction achieved by the contractor who performed the actual compaction operation. Certain information concerning the location of the street finish grade over water line trench tested was furnished by persons representing themselves as knowledgeable of those conditions. In many cases, independent verification of that information furnished to us by others, or the knowledge of that information by any person representing themselves as knowledgeable, is not possible. That information is relied upon during the performance of these tests.

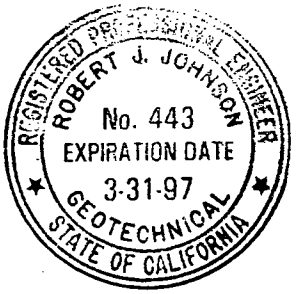
The contractor performing the work on this project remains primarily responsible and liable for the compaction achieved at this project. Compaction testing by our firm in no way relieves the contractor from his obligation to properly perform his work, and this report does not serve as a warranty or guarantee of the contractor's work or of the information supplied to us by the contractor.

The results in this report are based upon testing performed and data collected at separate locations, and interpolation between these locations, carried out for the project and the scope of services described. It is assumed and expected that the conditions between locations of tests are similar to those encountered at the individual locations where testing was performed. However, conditions between these locations may vary significantly. Should conditions be encountered in the field, by the client or any firm performing services for the client or the client's assign, that appear different than those described herein, this firm should be contacted immediately in order that we might evaluate their effect.

If this report or portions thereof are provided to contractors or included in specifications, it should be understood by all parties that they are provided for information only and should only be used as such.

This report and its contents are not intended or represented to be suitable for reuse on extensions or modifications of the project, or for use on any other project.

Respectfully submitted,
C.H.J., INCORPORATED



Ben Williams, Senior Staff Engineer

Robert J. Johnson, G.E. 443
Senior Vice President

BW/RJJ:sp

Enclosure: Field Compaction Test Summary Sheet

Distribution: City of San Bernardino Water Department (4)

FIELD COMPACTION TEST SUMMARY SHEET

Job No. 96483-1
Sheet 1 of 1

PROJECT: CITY OF SAN BERNARDINO WATER DEPARTMENT - STREET FINISH GRADE OVER WATER LINE, TRENCH, SIERRA WAY AND 11TH STREET, SAN BERNARDINO, CALIFORNIA

Date	Test No.	Location of Test	Depth Of Cut (ft.)	Depth Of Fill (ft.)	Depth Of Test (ft.)	DENSITIES			MC (%)	Soil Type	Remarks or Retest of
						Dry (lbs./ cu. ft.)	Max. (lbs./ cu. ft.)	Rel. (%)			
12/12/96	FG-1	Sierra Way, Intersection 10th Street, East Side		0.5	B.S.	131.7	132.0	100	5.3	3	
	FG-2	Sierra Way, Opposite 1023, East Side		0.5	B.S.	131.1	132.0	99	5.7	3	
	FG-3	Sierra Way, Opposite 1065, East Side		0.5	B.S.	129.3	132.0	98	5.5	3	
12/13/96	FG-4	Sierra Way, 100' N. of 9th Street, West Side		0.5	B.S.	127.5	132.0	97	7.8	3	
	FG-5	Sierra Way, Opposite 958, West Side		0.5	B.S.	126.4	132.0	96	6.7	3	
	FG-6	Sierra Way, Opposite 972, West Side		0.5	B.S.	129.3	132.0	98	7.5	3	
12/17/96	FG-7	11th Street, Opposite 124, North Side		0.5	B.S.	126.0	132.0	95	5.6	3	
	FG-8	11th Street, Intersection Mt. View, North Side		0.5	B.S.	125.5	132.0	95	4.7	3	
	FG-9	11th Street, Opposite 210, North Side		0.5	B.S.	127.1	132.0	96	5.0	3	

LEGEND: (SG) Tests on Subgrade Elevation; (BF) Tests on Backfill; (FP) Tests on Fill in Progress; (FG) Tests on Finish Grade Elevation; (MC) Moisture Content; (RX) Rock Corrected; (*) Denotes Failure

5273

C•H•J• INCORPORATED

P.O. Box 231 • 1355 E. Cooley Dr., Colton, CA 92324 • Phone (909) 824-7210 • Fax (909) 824-7209

December 27, 1996

City of San Bernardino Water Department
P.O. Box 710
San Bernardino, California 92402
Attention: Mr. James Dye

Job No. 96483-1

Dear Mr. Dye:

This letter transmits four copies of our Compaction Report, Street Finish Grade Over Water Line Trench Tests, Sierra Way and 11th Street, San Bernardino, California.

We appreciate this opportunity to provide geotechnical services for this project. If you have questions or comments concerning this report, please contact us at your convenience.

Respectfully submitted,
C.H.J., INCORPORATED

John E. Dalgity, Operations Manager

BW/JED:sp

C • M • J • INCORPORATED

P.O. Box 231 • 1355 E. Cooley Dr., Colton, CA 92324 • Phone (909) 824-7210 • Fax (909) 824-7209

December 27, 1996

City of San Bernardino Water Department
P.O. Box 710
San Bernardino, California 92402
Attention: Mr. James Dye

Job No. 96483-1

Subject: Compaction Report
Street Finish Grade over Water Line Trench
Sierra Way and 11th Street
San Bernardino, California

Dear Mr. Dye:

This report covers the results of in-place density tests taken to date on the street finish grade over water line trench at the above referenced location.

All tests were taken in coordination with and as requested by the client's representative.

FIELD PROCEDURE:

A total of nine in-place density tests were taken by the nuclear method between December 12 and December 17, 1996. A representative sample of the soil encountered was returned to the laboratory for determination of the Optimum Moisture Content - Maximum Dry Density curve.

The locations of the in-place density tests are indicated on the attached Field Compaction Test Summary Sheet.

OPTIMUM MOISTURE - MAXIMUM DENSITY RELATION:

ASTM D 1557-78

Soil Type	Classification	Optimum Moisture (Percent)	Maximum Dry Density (PCF)
3	Sandy Gravel, fine to medium with coarse, gravel to 3/4", gray (GP) base material	7.0	132.0

RESULTS:

The results of the in-place density tests taken to date, and the relative compaction in each case, are shown on the attached Field Compaction Test Summary Sheet.

LIMITATIONS:

C.H.J., Incorporated has striven to perform our services within the limits prescribed by our client, and in a manner consistent with the usual thoroughness and competence of reputable soils engineers practicing under similar circumstances. No other representation, express or implied, and no warranty or guarantee is included or intended by virtue of the services performed or reports, opinion, documents, or otherwise supplied.

This report reflects the testing conducted on the site as the site existed during the street finish grade over water line trench testing, which is the subject of this report. However, changes in conditions can occur with the passage of time, due to natural processes or the works of man on this or adjacent properties. Changes in applicable or appropriate standards may also occur whether as a result of legislation, application, or the broadening of knowledge. Therefore, this report is indicative of only those conditions tested at the time testing was performed, and the findings of this report may be invalidated fully or partially by changes outside of the control of C.H.J., Incorporated. This report should not be relied upon after a period of one year.

The test results presented herein represent an independent sample of the compaction achieved by the contractor who performed the actual compaction operation. Certain information concerning the location of the street finish grade over water line trench tested was furnished by persons representing themselves as knowledgeable of those conditions. In many cases, independent verification of that information furnished to us by others, or the knowledge of that information by any person representing themselves as knowledgeable, is not possible. That information is relied upon during the performance of these tests.

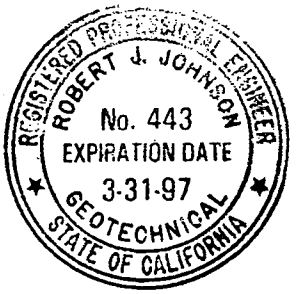
The contractor performing the work on this project remains primarily responsible and liable for the compaction achieved at this project. Compaction testing by our firm in no way relieves the contractor from his obligation to properly perform his work, and this report does not serve as a warranty or guarantee of the contractor's work or of the information supplied to us by the contractor.

The results in this report are based upon testing performed and data collected at separate locations, and interpolation between these locations, carried out for the project and the scope of services described. It is assumed and expected that the conditions between locations of tests are similar to those encountered at the individual locations where testing was performed. However, conditions between these locations may vary significantly. Should conditions be encountered in the field, by the client or any firm performing services for the client or the client's assign, that appear different than those described herein, this firm should be contacted immediately in order that we might evaluate their effect.

If this report or portions thereof are provided to contractors or included in specifications, it should be understood by all parties that they are provided for information only and should only be used as such.

This report and its contents are not intended or represented to be suitable for reuse on extensions or modifications of the project, or for use on any other project.

Respectfully submitted,
C.H.J., INCORPORATED



Ben Williams, Senior Staff Engineer

Robert J. Johnson, G.E. 443
Senior Vice President

BW/RJJ:sp

Enclosure: Field Compaction Test Summary Sheet

Distribution: City of San Bernardino Water Department (4)

FIELD COMPACTION TEST SUMMARY SHEET

Job No. 96483-1
Sheet 1 of 1

PROJECT: CITY OF SAN BERNARDINO WATER DEPARTMENT - STREET FINISH GRADE OVER WATER LINE, TRENCH, SIERRA WAY AND 11TH STREET, SAN BERNARDINO, CALIFORNIA

Date	Test No.	Location of Test	Depth Of Cut (ft.)	Depth Of Fill (ft.)	Depth Of Test (ft.)	DENSITIES			MC (%)	Soil Type	Remarks or Retest of
						Dry (lbs./ cu. ft.)	Max. (lbs./ cu. ft.)	Rel. (%)			
12/12/96	FG-1	Sierra Way, Intersection 10th Street, East Side		0.5	B.S.	131.7	132.0	100	5.3	3	
	FG-2	Sierra Way, Opposite 1023, East Side		0.5	B.S.	131.1	132.0	99	5.7	3	
	FG-3	Sierra Way, Opposite 1065, East Side		0.5	B.S.	129.3	132.0	98	5.5	3	
12/13/96	FG-4	Sierra Way, 100' N. of 9th Street, West Side		0.5	B.S.	127.5	132.0	97	7.8	3	
	FG-5	Sierra Way, Opposite 958, West Side		0.5	B.S.	126.4	132.0	96	6.7	3	
	FG-6	Sierra Way, Opposite 972, West Side		0.5	B.S.	129.3	132.0	98	7.5	3	
12/17/96	FG-7	11th Street, Opposite 124, North Side		0.5	B.S.	126.0	132.0	95	5.6	3	
	FG-8	11th Street, Intersection Mt. View, North Side		0.5	B.S.	125.5	132.0	95	4.7	3	
	FG-9	11th Street, Opposite 210, North Side		0.5	B.S.	127.1	132.0	96	5.0	3	

LEGEND: (SG) Tests on Subgrade Elevation; (BF) Tests on Backfill; (FP) Tests on Fill in Progress; (FG) Tests on Finish Grade Elevation; (MC) Moisture Content; (RX) Rock Corrected; (*) Denotes Failure

C • M • J • INCORPORATED

P.O. Box 231 • 1355 E. Cooley Dr., Colton, CA 92324 • Phone (909) 824-7210 • Fax (909) 824-7209

December 27, 1996

City of San Bernardino Water Department
P.O. Box 710
San Bernardino, California 92402
Attention: Mr. James Dye

Job No. 96483-1

Subject: Compaction Report
Street Finish Grade over Water Line Trench
Sierra Way and 11th Street
San Bernardino, California

Dear Mr. Dye:

This report covers the results of in-place density tests taken to date on the street finish grade over water line trench at the above referenced location.

All tests were taken in coordination with and as requested by the client's representative.

FIELD PROCEDURE:

A total of nine in-place density tests were taken by the nuclear method between December 12 and December 17, 1996. A representative sample of the soil encountered was returned to the laboratory for determination of the Optimum Moisture Content - Maximum Dry Density curve.

The locations of the in-place density tests are indicated on the attached Field Compaction Test Summary Sheet.

OPTIMUM MOISTURE - MAXIMUM DENSITY RELATION:

ASTM D 1557-78

Soil Type	Classification	Optimum Moisture (Percent)	Maximum Dry Density (PCF)
3	Sandy Gravel, fine to medium with coarse, gravel to 3/4", gray (GP) base material	7.0	132.0

RESULTS:

The results of the in-place density tests taken to date, and the relative compaction in each case, are shown on the attached Field Compaction Test Summary Sheet.

LIMITATIONS:

C.H.J., Incorporated has striven to perform our services within the limits prescribed by our client, and in a manner consistent with the usual thoroughness and competence of reputable soils engineers practicing under similar circumstances. No other representation, express or implied, and no warranty or guarantee is included or intended by virtue of the services performed or reports, opinion, documents, or otherwise supplied.

This report reflects the testing conducted on the site as the site existed during the street finish grade over water line trench testing, which is the subject of this report. However, changes in conditions can occur with the passage of time, due to natural processes or the works of man on this or adjacent properties. Changes in applicable or appropriate standards may also occur whether as a result of legislation, application, or the broadening of knowledge. Therefore, this report is indicative of only those conditions tested at the time testing was performed, and the findings of this report may be invalidated fully or partially by changes outside of the control of C.H.J., Incorporated. This report should not be relied upon after a period of one year.

The test results presented herein represent an independent sample of the compaction achieved by the contractor who performed the actual compaction operation. Certain information concerning the location of the street finish grade over water line trench tested was furnished by persons representing themselves as knowledgeable of those conditions. In many cases, independent verification of that information furnished to us by others, or the knowledge of that information by any person representing themselves as knowledgeable, is not possible. That information is relied upon during the performance of these tests.

The contractor performing the work on this project remains primarily responsible and liable for the compaction achieved at this project. Compaction testing by our firm in no way relieves the contractor from his obligation to properly perform his work, and this report does not serve as a warranty or guarantee of the contractor's work or of the information supplied to us by the contractor.

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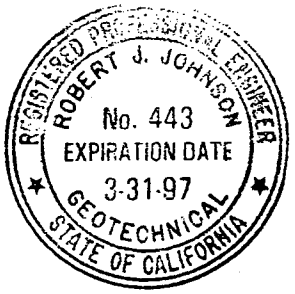
Respectfully submitted,
C.H.J., INCORPORATED



Ben Williams, Senior Staff Engineer

Robert J. Johnson, G.E. 443
Senior Vice President

BW/RJJ:sp

Enclosure: Field Compaction Test Summary Sheet

Distribution: City of San Bernardino Water Department (4)

FIELD COMPACTION TEST SUMMARY SHEET

Job No. 96483-1
Sheet 1 of 1

PROJECT: CITY OF SAN BERNARDINO WATER DEPARTMENT - STREET FINISH GRADE OVER WATER LINE, TRENCH, SIERRA WAY AND 11TH STREET, SAN BERNARDINO, CALIFORNIA

Date	Test No.	Location of Test	Depth Of Cut (ft.)	Depth Of Fill (ft.)	Depth Of Test (ft.)	DENSITIES			MC (%)	Soil Type	Remarks or Retest of
						Dry (lbs./ cu. ft.)	Max. (lbs./ cu. ft.)	Rel. (%)			
12/12/96	FG-1	Sierra Way, Intersection 10th Street, East Side		0.5	B.S.	131.7	132.0	100	5.3	3	
	FG-2	Sierra Way, Opposite 1023, East Side		0.5	B.S.	131.1	132.0	99	5.7	3	
	FG-3	Sierra Way, Opposite 1065, East Side		0.5	B.S.	129.3	132.0	98	5.5	3	
12/13/96	FG-4	Sierra Way, 100' N. of 9th Street, West Side		0.5	B.S.	127.5	132.0	97	7.8	3	
	FG-5	Sierra Way, Opposite 958, West Side		0.5	B.S.	126.4	132.0	96	6.7	3	
	FG-6	Sierra Way, Opposite 972, West Side		0.5	B.S.	129.3	132.0	98	7.5	3	
12/17/96	FG-7	11th Street, Opposite 124, North Side		0.5	B.S.	126.0	132.0	95	5.6	3	
	FG-8	11th Street, Intersection Mt. View, North Side		0.5	B.S.	125.5	132.0	95	4.7	3	
	FG-9	11th Street, Opposite 210, North Side		0.5	B.S.	127.1	132.0	96	5.0	3	

LEGEND: (SG) Tests on Subgrade Elevation; (BF) Tests on Backfill; (FP) Tests on Fill in Progress; (FG) Tests on Finish Grade Elevation; (MC) Moisture Content; (RX) Rock Corrected; (*) Denotes Failure

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P.O. Box 231 • 1355 E. Cooley Dr., Colton, CA 92324 • Phone (909) 824-7210 • Fax (909) 824-7209

December 27, 1996

City of San Bernardino Water Department
P.O. Box 710
San Bernardino, California 92402
Attention: Mr. James Dye

Job No. 96483-1

Subject: Compaction Report
Street Finish Grade over Water Line Trench
Sierra Way and 11th Street
San Bernardino, California

Dear Mr. Dye:

This report covers the results of in-place density tests taken to date on the street finish grade over water line trench at the above referenced location.

All tests were taken in coordination with and as requested by the client's representative.

FIELD PROCEDURE:

A total of nine in-place density tests were taken by the nuclear method between December 12 and December 17, 1996. A representative sample of the soil encountered was returned to the laboratory for determination of the Optimum Moisture Content - Maximum Dry Density curve.

The locations of the in-place density tests are indicated on the attached Field Compaction Test Summary Sheet.

OPTIMUM MOISTURE - MAXIMUM DENSITY RELATION:

ASTM D 1557-78

Soil Type	Classification	Optimum Moisture (Percent)	Maximum Dry Density (PCF)
3	Sandy Gravel, fine to medium with coarse, gravel to 3/4", gray (GP) base material	7.0	132.0

RESULTS:

The results of the in-place density tests taken to date, and the relative compaction in each case, are shown on the attached Field Compaction Test Summary Sheet.

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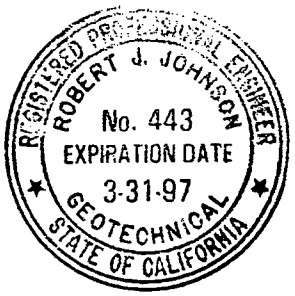

Ben Williams, Senior Staff Engineer

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FIELD COMPACTION TEST SUMMARY SHEET

Job No. 96483-1
Sheet 1 of 1

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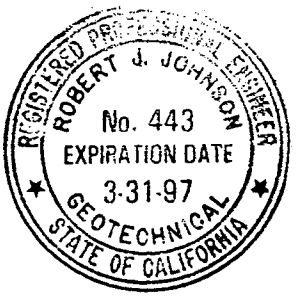

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